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AUTHOR Becker, Henry Jay
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ABSTRACT

Indices of racial segregation across different places of employment are presented for black and non-Hispanic white workers in the same general occupational category (e.g., managers; operatives). Black and non-Hispanic white laborers and service workers are more segregated from one another than are their racial counterparts in other occupational categories, once the relative supply of black workers in each occupation is accounted for. Black and white women at each occupational level are more segregated from one another than are black and white men, although differential employment in high and low segregation industries accounts for much of the sex differences. The racial composition of an establishment's work force in one occupation is strongly related to its racial composition in other occupations, especially within the blue collar and white collar subgroups. For certain occupational categories--namely professionals, sales workers, and clerical workers--the black proportion of the work force is higher the more the total establishment's employment is concentrated in that occupation. (Author)

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RACIAL SEGREGATION AMONG PLACES OF EMPLOYMENT

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Henry Jay Becker

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The Johns Hopkins University

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Introductory Statement

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through four programs to achieve its objectives. The Policy Studies in School Desegregation program applies the basic theories of social organization of schools to study the internal conditions of desegregated schools, the feasibility of alternative desegregation policies, and the interrelation of school desegregation with other equity issues such as housing and job desegregation. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. It has produced a large-scale study of the effects of open schools, has developed Student Team Learning instructional processes for teaching various subjects in elementary and secondary schools, and has produced a computerized system for school-wide attendance monitoring. The School Process and Career Development program is studying transitions from high school to post secondary institutions and the role of schooling in the development of career plans and the actualization of labor market outcomes. The Studies in Delinquency and School Environments program is examining the interaction of school environments, school experiences, and individual characteristics in relation to in-school and later-life delinquency.

This report, prepared by the Policy Studies in School Desegregation program, examines the extent of segregation among whites and minorities in the same occupations but in different places of employment. The report is part of the Desegregation Program's effort to analyze and synthesize the problem of segregation as it exists in the nation's educational, residential, and occupational institutions.

Abstract

Indices of racial segregation across different places of employment are presented for black and non-Hispanic white workers in the same general occupational category (e.g., managers; operatives). Black and non-Hispanic white laborers and service workers are more segregated from one another than are their racial counterparts in other occupational categories, once the relative supply of black workers in each occupation is accounted for. Black and white women at each occupational level are more segregated from one another than are black and white men, although differential employment in high- and low-segregation industries accounts for much of the sex differences. The racial composition of an establishment's work-force in one occupation is strongly related to its racial composition in other occupations, particularly though, within the blue-collar and white-collar subgroups. For certain occupational categories--namely professionals, sales workers, and clerical workers--the black proportion of the work-force is higher the more the total establishment's employment is concentrated in that occupation. Further research directions are suggested.

Since 1965, a number of studies have documented the extent of racial and ethnic segregation that exists nationally in the U.S. This descriptive literature, however, generally has been confined to the measurement of residential segregation and school segregation--that is, the extent to which neighborhoods in a city vary in their racial composition (c.f. Taeuber and Taeuber, 1965; Pascal, 1967; Hawley and Rock, 1973; and Sorensen, Taeuber, and Hollingsworth, 1974) and the extent to which different schools in the same school system have different racial composition (U.S. Commission on Civil Rights, 1967; Farley and Taeuber, 1974; Coleman, Kelly and Moore, 1975).

Along with neighborhoods and schools, the arena of employment is one of the most significant realms of social life. However, until now we have lacked comparable descriptive data on the extent of racial and ethnic segregation in employment. Of course, there is a large literature in sociology and in economics focusing on racial discrimination in the labor market and its consequences for the disproportional concentration of minority workers in certain occupational categories (e.g., Pascal, 1972; Von Furstenberg, Horowitz, and Harrison, 1974). However, there has been little systematic description or analysis of the segregation of white and black workers in the same occupation across different places of employment.

Each year, however, the Equal Employment Opportunities Commission (EEOC) collects data from over 35,000 employers on the racial and sex composition of their work force, for each of nine broadly defined occupational groupings from managers to service workers. By aggregating

this data, we can compare these occupational categories in terms of their "internal" racial segregation--that is, racial segregation among "occupational peers." For instance, we can determine whether white and black skilled craftsmen are more segregated from one another (more likely to work at different places of business) than are black and white unskilled laborers. We can also examine the degrees of employment segregation exhibited by occupational groups within specific industries as well as the employment segregation of gender-specific occupational categories (e.g., female managers). In summary, the EEOC data enables us to measure the cross-racial, occupational-peer, on-the-job experiences of specific categories of workers.

In this paper, we focus on the segregation between the non-Hispanic white employed population and the black working population. First, we look at the general level of employment segregation between these two ethnic categories and then we disaggregate by occupational category, by sex, by industry, and by several other factors. Our presentation is based on two types of measures: (1) the absolute level of cross-racial experience (e.g., for the average non-Hispanic white professional, the proportion of blacks among the professional-level employees at his place of work), and (2) a standardized measure of segregation--a measure of how much the average racial environments of black and non-Hispanic white workers in the same category differ from one another and from the racial environment that would exist under the condition of complete integration of that category of workers.

Source of Data

The annual Equal Employment Opportunities Commission survey (EEO1) is a mail census of most private employers in the country. Nearly all private employers with 100 or more employees are included in this survey.[1] Multi-establishment firms file a separate report for each establishment or place of business that has 25 or more employees. However, because not every employer complies with the EEOC regulation (Ashenfelter and Heckman, 1976, fn. 5) and because many employers are excluded from the survey's coverage (small employers, tax-exempt groups), the employment data exist for only about half of all private non-agricultural workers (and only about 5% of workers employed ir agriculture).[2] The 1975 data, which are used in this analysis, cover approximately 150,000 different places of employment. Our analysis is based upon a one-in-twenty sample (N=7483) of these establishments.

Since the data for this study are derived from employer self-reports, the question of data reliability seems particularly germain. Unfortunately, we have little useful evidence to offer in this regard. Employers were given instructions to record racial/ethnic data based on a visual survey, personnel records, or, where necessary, direct inquiry. However, the reports, while audited for annual changes in establishment racial composition, were not systematically validated for this study.

Employers were given a paragraph-length description of each of the nine occupational categories. The paragraphs contained a brief discussion of skill and educational requisites and examples of the

kinds of jobs included in the category. Again, however, we have no evidence to know how attentive the survey respondents were to these instructions and definitions.

On the other hand, our estimates of segregation would be most likely to be in error if establishments with a lower-than-average proportion of minority employees were disproportionately among the non-respondents to the survey or if firms with fewer black workers tended to overreport their presence. Such biases would also distort the overall racial composition of the EEO1 sample. Consequently, it is assuring to report that the sample's racial composition approximates quite closely the racial composition of the labor force of the non-agricultural, private sector as reported by the Bureau of Labor Statistics (B.L.S.). In their survey of the population with work experience in 1975 (Bureau of Labor Statistics, 1976), B.L.S. estimated a private, non-agricultural work-force that is 11.5% "black and other races." Our EEO1 sample is 11.9% black and other races (10.7% black, 1.2% other) in addition to 4.2% "Spanish-surnamed" who are a minority group within the white racial category.

Thus, while there may be some slight underreporting by homogeneously white establishments and some overclaiming of black and other minority employees, there is no evidence to suggest major impediments to our use of the data to analyze patterns of racial segregation in employment.

Employment Segregation: Descriptive Statistics and Measurement of the Segregation Index

A picture of the differential racial environments of black and non-Hispanic white workers in the EEO1 labor force is indicated by the following statistics: Half of all non-Hispanic white workers included in the enumeration work at a place of business whose work force is less than 5% black. Yet only one out of twelve black workers find themselves in this small a minority. On the other hand, the median black worker is employed at an establishment that is about 21% black whereas only one white worker in nine works in such a racially heterogeneous situation. In sum, the median black worker's work environment consists of more than four times the proportion of black workers as does the environment of the median white worker.

Because the distributions of racial composition are somewhat asymmetric, the mean (average) percent black among fellow workers is somewhat higher for both blacks and whites. The mean "percent black" for non-Hispanic whites is 8.7% (along with 4.3% "other," largely Hispanic whites), while the mean values for black workers are 27.1% black and 5.1% "other." The differences between whites and blacks are still quite substantial.

It is theoretically possible for the racial distributions of co-workers to be identical for each ethnic group. In such a case, the percent black at all establishments would be identical. The more that establishments vary in their racial composition, the more the mean racial environment for white and black workers varies as well. In the

extreme case, each ethnic group works at an establishment that only employs members of that group and the variance in racial composition among the establishments is at its maximum.

An index measuring points along the continuum from complete integration (no variation in racial composition) to complete segregation (variation at its maximum) is called a "segregation index." One such index reflecting measurement along this continuum has been used by Coleman in some of his earlier work on school desegregation (Coleman, Kelly, and Moore, 1975). The Coleman index, which we describe below, is based on the cumulative racial experiences of individual black and white workers.[3]

As applied to employment segregation, Coleman's index compares the average existing cross-racial experience of workers with the cross-racial experience that would exist under a condition of complete integration.

The actual experience with black co-workers by white workers, for example, can be expressed as the mean percent black at the same place of employment for all white workers, or

$$P_{b|w} = \frac{\sum_{i=1}^{N} n_{w_i} \cdot P_{b_i}}{\sum_{i=1}^{N} n_{w_i}}$$

when P_{b_i} = percent black among total employment in i'th establishment

n_{w_i} = number of whites in i'th establishment

N = total number of establishments

This is sometimes called the "percent black for the average white," although it is not the same as the median white worker's experience but, more properly,"the average percentage of black workers for all white workers."

Under complete integration, "percent black for the average white" is merely the overall percentage of black workers in the universe under study, or P_b. Thus, since blacks constitute 10.7% of all workers covered in the EEOC data set, under complete integration the average white worker would work with 10.7 blacks for every 100 co-workers (including himself). However, in fact, the mean percent black for all white workers is 8.7%. Thus, white workers are segregated from black workers by the proportion:

$$S^*_{b|w} = \frac{P_b - P_{b|w}}{P_b} = \frac{10.7 - 8.7}{10.7} = \frac{2.0}{10.7} = .19$$

(In this paper, we drop the decimal point, using $S_{b|w} = 19$ $(= 100 \times S^*_{b|w})$ as our measure of segregation.)

The segregation index thus indicates the proportion of under-representation of one racial group in the work environment of another group. It is, of course, zero under complete integration and 100 under complete segregation. It can be shown that where X and Y are mutually exclusive and exhaustive, $S_{x|y}$ equals the difference between the mean proportion S for all X's and the mean proportion X for all Y's--that is, the difference between the racial environments of the two groups. In addition, it follows that $S_{x|y} = S_{y|x}$ under these conditions. Where

X and Y are not exhaustive, $S_{x|y} \neq S_{y|x}$. However, where they are nearly exhaustive, as in the case of non-Hispanic whites and blacks, the figures are generally very close. In our case, for the employment segregation of all non-Hispanic white and black workers, both $S_{b|w}$ and $S_{w|b} = 19$.[4]

Comparison with School Segregation; Disaggregation by Occupation

How does employment segregation as a whole compare with segregation in schooling and housing? The overall segregation statistic for employment (S=19) is significantly lower than that reported for elementary and secondary students (S=56, 1972; Coleman, Kelly and Moore, 1975) and that recently calcualated for four-year colleges (S=42, 1974; McPartland, 1978). Although this statistic has not been calculated for residential segregation, it is clear that the latter would be significantly higher as well. In addition, it must be pointed out that a certain degree of segregation across places of employment is due to the different geographic distributions of blacks and whites across the various metropolitan areas and rural regions of the country. The segregation statistic for schoolchildren is reduced to 37 for "within-district" segregation, so that some reduction in the employment segregation index would no doubt be recorded if general place of residence were controlled. (Our data do not permit us to perform this analysis at the present time.)

However, the relatively modest level of employment segregation (in comparison to school segregation) conceals some highly interesting occupation-specific and sex-specific differences in employment segregation,

along with additional complications related to the overall proportion black in the firm, its industrial classification, the size of the company's work-force, and number and proportion of that work-force who are employed in the black person's occupational category. It is with these factors that we will now deal.

Table 1 gives the employment segregation indices and related cross-racial environments for each of the nine major occupational categories. Data for a given occupation refers only to the racial composition of employees in that occupational category at the same place of employment. Thus, in row one of the table, for the average black official or manager, 81.6% of his or her co-workers who are officials or managers are non-Hispanic whites, whereas non-Hispanic whites as a whole make up 94.2% of all officials and managers covered in the EEO1 survey.

Table 1 About Here

Table 1 indicates that laborers and service workers, although constituting more racially heterogeneous populations than the other occupational categories, at the same time are by far the most racially segregated of the nine occupational categories, given their larger pools of minority workers.

It is true that the average non-Hispanic white laborer and service worker works among a co-worker group that has more black workers than do those employed in the other occupations. The percentage of black laborers for the average white laborer, for example, is 12.6%, which is five times the proportion of blacks for the average white professional.

However, if laborers had the same degree of between-establishment segregation as professional workers have, the average white laborer would be working in a group that was nearly 20% black, a full fifty percent increase over the present proportion of black laborers in his environment.

Among the other occupational categories, managers, professionals, and craft workers have somewhat less employment segregation by race than the rest, and machine operatives have a bit more than the others. But the similarities in the segregation indices for these seven categories set them apart rather strikingly from the laborer and service worker categories.

One of the major contributors to the segregation of blacks and majority whites is the large proportion of whites who work with no blacks at all at the same occupational level as themselves. While one out of eight non-Hispanic whites in the EEO1 sample work with no blacks anywhere in their place of employment, nearly half of all white managers have no black managers in their establishment, more than one-third of all white professionals, technical workers and sales workers have no black co-workers (i.e., employees in the same occupational category), and even among the remaining occupational categories nearly one-quarter of all majority white workers do not see black workers doing the same kind of work that they do (Table 2).

Table 2 About Here

Black workers (and those of other minorities), who constitute a much smaller fraction of the total employment than do majority whites,

are not nearly as likely to be isolated from members of different racial/ethnic groups. Nearly all blacks work with at least some whites in their occupational category and more than 90% work with at least one other black in the same category. Thus, while racial segregation is often considered to be a problem of integrating the black and minority cultures into the dominant Anglo-white culture, from a statistical perspective, it is the majority population, as it nearly always is, that is the isolated one under conditions of segregation (Blau, 1977). Consequently, the remaining discussion will focus on the non-Hispanic white working population and their experience with and segregation from black workers, mainly those in the same occupational category.

Sex Differences

Since employment segregation by sex is such a major part of the occupational structure, a clearer picture of racial segregation in employment is probably given by examining the employment segregation of white and black women separately from that of white and black men. Table 3 shows the experience with black co-workers of the same sex and in the same occupational category for non-Hispanic white men and women. At all nine occupational levels, white and black women are more segregated from one another than are white and black men. This is true both in occupational categories where black women are found in greater proportions than black men (white collar occupations and skilled blue-collar work) and where the reverse is true (remaining blue-collar categories and service workers).

Table 3 About Here

Examining work-site segregation across all occupations, the segregation of women is nearly 40% higher than the racial segregation among men. For the job categories of highest pay and prestige, women are more than twice as segregated as are men. Only among clerical workers does the segregation index for men approximate that for women. For both sexes it is again the laborer and the service worker categories that exhibit the greatest degree of segregation between blacks and non-Hispanic whites.

Cross-occupational racial segregation

So far, in our discussion of employment segregation by occupational level, we have examined whites and blacks in terms of their experience of the opposite racial group among their own occupational peers. It also seems reasonable to ask how segregated white workers in particular job categories are from black workers of all job categories--as well as the complementary question: how segregated particular occupational groups of blacks are from white workers in general. To do this, we need to compare the actual cross-racial experiences of a particular category of worker (for example, for white laborers, the average percent black among all workers at his place of employment) with an appropriate standard of "complete integration."

The standard we have been using so far, the overall proportion black in the particular universe being examined (all workers, managers, etc.) does not apply here. The category of workers whose racial composition is at issue (all occupations in our example) is not the same as the universe of workers whose segregation experiences are being

measures (laborers). The overall proportion of blacks in these two universes need not be the same--and they generally aren't. (Percent black (all occupations) = 10.7%; percent black (all occupations) for all laborers = 14.1%.) The appropriate standard to compare white laborers' job experience of blacks is the experience of all laborers--that is, the average percent black (all occupations) for all laborers. Thus, we use an adjusted segregation index for such comparisons, which for our example is:

$$S'_{ba|wl} = \frac{P_{ba|l} - P_{ba|wl}}{P_{ba|l}}$$

where $P_{ba|l}$ = percent black all occupations averaged for all laborers (14.1%)

$P_{ba|wl}$ = percent black all occupations averaged for white laborers (8.6%)

Using this adjusted segregation index, we find (see Table 4) that whites in the higher and medium pay/prestige categories tend to be less segregated from black workers as a whole than they are from blacks in their own occupations. White managers, for example, are less than one-third as segregated from black workers as a whole than they are from their fellow managers who are black. On the other hand, whites in the lower skilled fields (operatives, laborers, and service workers), who were already shown to be more racially segregated than other whites within their own job category, remain as highly segregated from black workers in general as they are from blacks in their own occupation.

Table 4 About Here

A different pattern exists for the segregation of blacks in a given occupation from white workers in general.[5] Blacks in all categories except managers are less segregated from whites in general than they are from whites in their own occupational group. And, in contrast to white laborers and service workers, black laborers and service workers are only slightly more segregated from white workers in general than are blacks in higher skilled job categories.

The results shown in Table 4 thus suggest that is is the non-Hispanic white laborer and service worker groups which are the most segregated from cross-racial work experiences in general. Applying the "adjusted" segregation index to particular pairs of occupation-race-sex combinations, suggests the same conclusion.[6] For male workers, the pairs of occupations with the highest segregation indices are white laborers and black craftsmen (37), white laborers and black operatives (34), and white laborers and black managers (30). For women, pairs with the highest values are these: white laborers and black clerical workers (51), white laborers and black managers (50), white service workers and black professionals (44), and white service workers and black technical workers (44). Even when including the several pairs with the next-highest index values, all but one involve white laborers or service workers. Black occupations, on the other hand, are spread out among seven categories, from operative to managers. Also striking in the complete matrix of segregation scores by sex (not shown here) is the large number of pairs of female race x occupation comparisons that have relatively high segregation scores.[7]

Accounting for Employment Segregation

Until this point, what we have had to say about the employment segregation of men and women in different occupational categories has been primarily descriptive. I would like to move, now, in an explanatory direction--in two ways. First, I would like to consider some additional variables that might help to account for the amount of segregation that we have found to exist among places of employment generally and for our nine occupational categories in particular. Secondly, I would like to examine these same factors for their utility in explaining differences among the segregation scores for the occupational categories and differences between the segregation indices of men and women.

The four variables we shall look at are (1) the industry in which the establishment is located, (2) the size of the establishment (both the total number of workers and the number in a given occupation), (3) the overall racial composition of the establishment (to account for occupation-specific segregation), and (4) the degree to which an establishment's work force is concentrated in the given occupation. (For example, does a firm whose employment is mainly salesman employ a higher proportion of blacks as salesmen than the same-sized firm that only has a few salesmen--are these latter more apt to be white workers only.)

Industry and Size

The obvious variable to examine first is the industry of the firm. Different industries have strikingly different patterns of employment--both in terms of the mix of occupational levels of the work-force and

in terms of their distribution of male and female employees.

Our data show, though, that racial segregation between establishments in the same industry is on a par with the overall level of segregation across all establishments. Five of the eight industry combinations we employed (see Table 5) have segregation indices between 18 and 21. However, female employment is heavily concentrated in the industry group with the highest between-establishment segregation (services) while the greatest number of male workers are employed in durable manufacturing, the industry with one of the lowest between-site segregation indices. Thus, while the overall segregation index is 7 points higher for females, the average industry-specific male-female difference in their segregation indices is only 3 points.

The industry variable is not nearly so effective in accounting for differences among the occupational categories as it is for sex differences. Examining each of the eight industry groups separately, segregation is consistently higher among laborers and service workers than elsewhere. The average within-industry segregation indices for these two categories (weighted by occupation-specific employment) is 39 and 35 respectively. At the other end, managers and professionals are even more distinctively the occupational groups with the least between-establishment segregation of blacks and whites. Their within-industry weighted averages are both equal to 12, four points under the next-nearest occupational categories (Table 6).

Besides industry, size of the establishment is another important factor in the differential employment of blacks. Black workers are

employed in larger proportions at places of business that employ more people. In our sample, those establishments with fewer than 50 workers have, on the average, a 7% black labor force. Those with 500 or more employees, on the other hand, have a labor force that is 12.4% black. Thus, a certain amount of segregation between whites and blacks is due to their being employed in differentially sized establishments. However, there is nearly as much variation in racial composition among establishments of roughly the same size as there is among all places of business. For smaller firms, there is even greater variation. For example, the segregation index among establishments having between 200 and 499 employees is 25, several points above the index for all establishments (19). The index among places with 100 to 199 employees is even higher (28). Only among large establishments--those that employ 500 or more workers--is the segregation index between places (15) smaller than the overall segregation index for all establishments. These larger places do employ 52% of all workers in the sample, but they constitute only 8.4% of all establishments surveyed.[8]

Racial Composition of Other Employees

Turning once again to consideration of segregation rates by occupation, we can see from Table 7 that the establishment's overall propensity to hire black workers plays an extraordinarily large role in determining the proportion black among employees in any one occupation. The correlation between any single occupational category's percent black and the establishment's percent black among employees in the other eight categories goes no lower than r = .38 (sales workers) and goes as high as r = .60 (laborers). On the other hand, hiring of

blacks in white collar positions is not strongly associated with the proportion of blacks hired for blue-collar positions at the same establishment. (The r's vary from .19 to .35.) Within these broad occupational divisions, the associations are much higher, averaging .46 for correlations among the five white collar categories and .47 among the four blue-collar ones.

As a result of this strong relationship between the presence of blacks in any one occupational category and their availability in the establishment's remaining work-force, the occupation-specific segregation indices among establishments with similar overall employee racial compositions tend to be quite low. That is, since racial composition of one category of workers is strongly related to the racial composition of the others, when the latter is held constant, as here, there is that much less variation remaining in the former--thus the lower index value.

Table 8 About Here

Table 8 gives occupation-specific segregation indices for several subgroups of establishments defined by their having similar racial compositions among workers in all the occupational categories other than the one currently considered. In other words, the segregation index for clerical workers in establishments where the racial composition of all other workers is between 5 and 10 percent black is 11. This is substantially less than the segregation index for clerical workers at all establishments (20).

Note, however, that establishments with majority black work forces do still vary substantially in the proportion of black workers hired to fill any one occupational category--particularly for those occupations that otherwise have low segregation indices (e.g., see "60-69% black" in Table 8).[9] This is also true for places with no blacks at all in the other eight occupational categories--such establishments do vary considerably in the proportion of blacks hired to fill slots in this one occupational category. Except for these extremes (no blacks in the other categories or black majorities), the proportion of blacks in any given occupation will tend to be quite similar among establishments with similar racial distributions of their other employees.

In comparison to the effects of the establishment's general racial employment pattern on the racial segregation of particular occupations, the effects of other variables we examined are quite small. However, some relationships are worth noting.

Number and Proportion of Same-Occupation Employees

For certain occupational categories there is an association between the number of employees holding those types of jobs and the proportion of them who are black. The clerical and sales categories are particularly noteworthy in this regard. For example, where there are less than five clerical workers at a place of business, only 3.3% of these are black. However, when the establishment employs over one hundred clerical workers, the proportion black in these establishments climbs to 12.2%. Among sales workers, the differential is almost as dramatic. Among the establishments employing the fewest sales workers, blacks constitute only 1.4% of sales workers; among those employing over 100 such workers, blacks make up 6.9% of the sales force.[10]

Other occupational categories have different relationships among these two variables. Black professionals comprise the largest portion of their work force in places employing from 25-99 such workers. Blacks among technical workers also tend to be found in greater proportions in the establishments employing a moderate-to-large number of such workers. Service workers, on the other hand, have a lower proportion of blacks at these intermediate sized employee classes. Instead, their presence is maximized both among those establishments employing fewer than 10 service workers and among those places with over 100 such workers.

When there are a large number of persons employed within an occupational group at a particular establishment, chances are that this occupational category also provides a larger-than-average proportion of the establishment's overall employment. In other words, where the number of salesmen is high, it is likely that salesmen constitute a larger-than-average fraction of the establishment's overall work force. Thus, the association between the proportion of an establishment's employees in a given occupation who are black and the total number in that job category may be confounded by this second variable.

Indeed, the same strong relationship between percent black and concentration of that occupation (this time in terms of proportion of the work force instead of absolute numbers) is found in the EEOC data for both salesworkers and clerical workers. For example, where sales workers constitute less than 5% of a company's employment, only 1.9% of the sales workers are black, but where sales workers constitute 40% or more of the total employment, the black proportion among them rises to 6.1%. For clerical workers, the comparable figures are 4.3% and 14.1%.

Similar positive associations can be found for craft workers and professionals and a negative association between proportion black and concentration in the occupation for operatives. Service workers, again, show a curvilinear picture, with the black proportions higher at places where service workers either constitute a very small (less than 10%) or very large (more than 40%) portion of the place's total labor force.

Regression Analysis

In order to determine the relative magnitudes of the effects of correlated variables such as "proportion in occupation" and "number in occupation," multiple regression analysis procedures were used to predict the racial composition of each occupational category for the sample of establishments with one or more such workers. In contrast to the analysis using the segregation index, this regression procedure treated all places of business equally, without weighting according to total number of employees. Male and female workers were combined, and five variables were used as predictors: industry (seven dummy variables), percent black among the establishment's employment in the eight other occupational categories, total number of employees at the establishment, total number of employees in the given occupational category, and proportion of the establishment's total employment contributed by the given occupational category.[11]

Almost without exception, the results of the multiple regression procedure are parallel to the bivariate analyses described earlier (see Table 9). For all nine occupational categories, the establishment's overall racial composition (percent black, other eight categories) is by far the most significant predictor of the racial composition of the

particular occupational category considered. Beta coefficients range from a low of +.26 for professional workers to +.60 for predicting the racial composition of laborers. Industry is also moderately associated with differential employment of blacks for all nine occupational categories. Depending on the occupation, from 1% to 3% of the variance in racial composition is uniquely attributable to industry.

Table 9 About Here

Using the multiple regression procedure, we were able to disentangle the roles of relative and absolute size of the occupation's work force in affecting its racial composition. It appears that the proportion of the establishment's work force employed as sales workers or as professionals is a more reliable predictor of the occupation's racial composition (β=.14 and .16) than is the number of workers in the category. However, both proportion and number of workers are independently significant predictors of the racial composition of clerical workers (β=.13 and .15). The total number of workers in the establishment does not appear to be a significant factor in the determination of the racial composition of any of the occupational groups, except, marginally, craft workers (β= -.06). Based on our examination of the bivariate relationships, squared terms for proportion employed in the occupation and number employed in the occupation were entered into regression equations for professional, technical, and service workers. In each case, the additional terms for proportion employed (but not for number employed) were responsible for statistically significant increases

in the R^2 statistic. The least squares models support the prior descriptive analysis that blacks are hired in somewhat smaller numbers for professional and technical jobs when such jobs are either rare or dominant in the establishment's total employment. The opposite pattern holds for service workers--the black percentage is higher under such conditions.

Discussion and Summary

To a large extent, segregation of blacks and non-Hispanic whites in the same general occupational category is a function of corresponding variations in the racial composition of all employees at each establishment. That is, the racial composition of any single occupational group at a particular place of work tends to follow fairly closely the racial composition of workers in other occupations at the establishment. To some degree, however, and for some occupations, such factors as the relative concentration in that occupation of the establishment's total employment and the absolute number of people working in that occupational category do make a difference in the proportion of black workers that are hired.

On the whole, the fact that different industries and different sized firms vary in the proportion of black workers that are hired does not seem to account for very much of the between-establishment racial segregation that exists, except for slight variations in the racial composition of particular occupational categories.

On the other hand, the consistently higher segregation indices registered for women are partly accounted for by sex differentials in industry of employment--with women finding employment in industries

that are generally more racially segregated, regardless of sex.

The EEOC data show rather conclusively that major differences exist among occupations in the amount of racial segregation across work locations. Both men and women in laborer and service positions, and to a lesser extent those in semi-skilled employment, are much more racially segregated among establishments than are workers in other occupations. However, since these occupations do include a larger proportion of black workers than do the other categories, the average white workers experience of black co-workers is in fact a bit higher in these three occupations than in those occupations where the racial isolation of white workers derives not from between-place segregation but because of the absence of available blacks working in these occupational categories. Thus, from one perspective, although the whites in the low income/low prestige occupational categories are more segregated from black co-workers in a statistical sense, those in the higher skilled categories remain more isolated from them.

Differences among the occupations in their segregation indices do not appear to be the result of industry differences in the mix of occupations utilized, nor are they due to differential sex composition, and only partially do they seem to be due to differences in the average racial compositions of employees in other occupations.

It appears plausible instead that unskilled labor and service work is the most racially segregated of all occupations specifically <u>because</u> of the greater concentration of blacks (whose racial identity gives them low prestige among whites anyway) among these categories

of workers. The concentration of such a low prestige group in their own occupation may make white workers especially desirous of obtaining employment in race-segregated situations. Thus, while the segregation index controls statistically for the racial composition of each occupational category, it may be that racial composition itself, combined with elements of group prestige and associated social behavior, causes the segregation differentials among occupations.

Our data have enabled us to proceed in limited ways to measure and understand racial segregation in employment, an area that has received little systematic attention to date. Racial segregation that is due to differing geographical distributions of whites and blacks across regions and metropolitan areas is one component of the picture that was clearly missing in our analysis. We hope to have data available in the next few months to be able to add this consideration to our discussion.

In addition, the notion of "occupational category" is tremendously broad. To what extent is racial segregation within one of our categories due to differential racial composition of the specific occupations within the category (and corresponding differentials among establishments in their requirements for such jobs)? With the EEOC data, it was not possible to proceed in this direction. One study has done so, using Bureau of Labor Statistics wage data, in regard to sex segregation among specific clerical occupations (Blau, 1975), but to date, racial segregation has not been investigated in this way.

A final direction that future research might be expected to go, once geographic information was available, is the comparison of American communities in terms of their overall tendencies towards social segregation

by race--in employment, in school enrollment, and in residential location. To what extent do communities that are highly segregated on one of these dimensions tend to be segregated also on the others?

Segregation between the majority white population and the various minority ethnic groups that constitute this society is, in its broadest sense, one of the two or three most critical problems of the century. To the extent that blacks and whites in the same kind of work, by being employed in separate and distinct establishments, are prevented from developing the kind of peer-like, non-hierarchical social integration that characterizes co-workers' interaction, the opportunity structure (which still operates to a large extent by the informal network of job peers) will continue to discriminate against the black and other ethnic minority worker.

Notes

1. Schools and tax-exempt private clubs are exempt. Also, employers in the state of Hawaii file different reports and are not included in the data discussed here. On the other hand, the survey population includes government contractors with total employment between 50 and 99, who would otherwise not be included.

2. In 1975, the most recent year for which EEOC data are available, the survey covered 29.8 million private non-agricultural workers, or about 48% of this labor force. Coverage was most complete in the industries whose establishments tend to be large. For example, coverage was estimated to be 80% in durable goods manufacturing and 71% in non-durable manufacturing, but only 31% in retail trade and 29% in wholesale trade employment.

3. The index is also related to variability in establishment racial composition--it is the proportion of the variance in the dichotomous variable "race" that is "between-establishments" (Zoloth, 1974). Thus, it is a measure of the variability in racial composition across establishments with the establishments weighted by their total employment (rather than contributing equally regardless of size).

4. Other measures of segregation produce different values for black/white employment segregation. The most widely used segregation statistic, the index of dissimilarity (Taeuber and Taeuber, 1965), gives a value of .48 on a scale from 0 to 1. While the two indices do tend to be highly correlated, Cortese, Falk, and Cohen (1976) recently directed

attention to a serious problem with the dissimilarity measure's use in comparative study.

In any particular aggregate, a certain amount of segregation (unequal distribution) is inherent, even when people are randomly distributed across the units in the aggregate. The measure of segregation under a random distribution might be called its "expected value." Unfortunately, when aggregates being compared for their relative internal segregation differ either in terms of size of the units in each aggregate or in terms of the overall racial composition of each aggregate, the expected values of the dissimilarity index differ sharply. Thus, inter-aggregate comparisons of dissimilarity scores require a correction factor to take account of these varying expected values. Elements of such a correction factor have been proposed by Cortese and his colleagues; however, computational problems suggest that other solutions, such as the use of a completely different index may be superior.

The Coleman segregation index can be shown to be relatively free of the above problem. The expected value of this index for a dichotomous variable randomly distributed across equal-sized organizational units is equal to 100/N where N is the total number of workers in the organizational units (Becker, McPartland and Thomas, 1978). Thus, its expected value does not depend on the racial composition of the aggregate and rapidly approaches zero for organizational units above, say, 50 members.

5. The calculation of the segregation index for blacks in particular occupations from whites in all occupations deviates from our usual

pattern of calculating the percent black for the average white worker in the appropriate category. Instead, we use the percent white for the average black. The percent black (salesperson) for the average white worker (all occupations) includes contributions of "zero" percent black for the many white workers in establishments with no salespersons at all. To avoid any statistical problems caused by this factor, we use the complementary calculation.

6. The adjusted segregation index for cross-occupational comparisons is somewhat different than that used to compute the segregation of members of one occupation from opposite race experiences for all occupations.

$$S'_{bx|wy} = \frac{(\%\text{ black in occ. for all (same-sex) workers in occ. Y}) - (\%\text{ black in X for avg. white in Y})}{(\%\text{ black in X for all workers in Y})}$$

for only those Y's with 1 or more worker in X.

The limitation of coverage included at the end is because Y's with no persons in category X at their establishment would be contributing "0% black" rather than not contributing at all if such a condition were not explicitly included. However, even without this exclusion there would have been little difference in the overall results.

7. Using the adjusted segregation index it can also be shown that white women are more segregated from their black occupational peers of both sexes than are white men. The differences, while substantial, are not as great as for the within-gender comparisons shown in Table 3.

8. Random allocation of white and black workers to different establishments would produce more segregation among the very smallest firms

than among larger places. But with the establishment size categories with which we are dealing here, the result of subtracting segregation due to random generation leaves the overall results essentially unchanged. With this correction applied, the smallest establishments (under 100 employees) are slightly less segregated (S=23) than medium-sized places (S=26).

9. The larger variations among these few establishments with majority black work forces in the other occupations may be due to the impact of other variables operating in these circumstances. For example, three interaction terms involving "percent black, other occupations" were significant predictors in a regression equation for predicting clerical worker racial composition. Specifically, when "percent black, other occupations" was "high" and clerical workers were a large proportion of the establishment's work force, the proportion of clerical workers who were black was similarly high. However, in predominantly black firms with a small proportion of clerical workers, the clerical workers they did have were apt to be white instead. Two other interaction terms involving "percent black, other occupations" were also significant.

10. For both occupational categories, the relationships between number of such workers and the proportion of them who were black are completely monotonically increasing over the six categories of size used in the analysis.

11. To minimize costs, a 50% sample of establishments was selected from the 7483 cases used in the preceding analysis.

It is recognized that several of the predictor variables do not vary independently. Thus, "percent clerical" equals "total number of clericals" divided by "total employment," and the latter two terms, in addition, are in a "part-whole" relationship to one another. However, each variable was included because of its conceptual plausibility as a responsible agent--that is, each variable might be causally responsible for variations in the racial composition of a given occupation's work force across establishments.

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Table 1

Racial Segregation in Employment
by Occupational Level, U.S. 1975

	Avg. % non-Hispanic White at same occup. level for Blacks	Percent non-Hispanic White	Avg. % Black at same occup. level for non-Hispanic Whites	Percent Black	Segregation Index [a/]
Managers and Officials	81.6%	94.2%	2.7%	3.1%	15
Professionals	78.9	92.1	2.5	3.0	14
Technical Workers	70.7	88.3	5.2	6.5	20
Sales Workers	72.0	91.0	4.4	5.6	21
Office and Clerical Workers	68.9	85.6	7.8	9.7	20
Craft Workers	74.8	88.9	6.0	7.1	16
Operatives	60.9	79.1	11.0	14.3	23
Laborers	41.5	69.3	12.6	21.0	40
Service Workers	42.5	68.5	14.0	22.5	38
All Jobs	67.8%	83.7%	8.7%	10.7%	19

[a/] Segregation Index is average of $S_{w|b}$ and $S_{b|w}$, which were within 1.0 from one another for all but one occupation. (Segregation of managers: non-Hispanic whites from blacks, $S_{b|w} = 16$; blacks from non-Hispanic whites, $S_{w|b} = 13$).

Source: EEOC 1975 Survey of Private Employers, 1/20 sample.

Table 2

Racial Composition of Co-Workers*, Same Occupation, Same Establishment: for Non-Hispanic Whites and Blacks

Racial environment of..	Proportion with this co-worker* racial composition				
	No (other) Blacks	less than 5% Black	At least 20% Black	less than 20% White	No (other) Whites**
White** Managers/Off'ls.	48%	81%	1%	0%***	0%***
Black Managers/Off'ls.	15%	40%	14%	3%	1%
White Professionals	33%	86%	1%	0%	0%
Black Professionals	8%	49%	14%	6%	1%
White Technical Wkrs.	38%	67%	7%	0%	0%
Black Technical Wkrs.	7%	19%	44%	4%	1%
White Sales Workers	39%	69%	4%	0%	0%
Black Sales Workers	6%	20%	38%	7%	3%
White Office/Clerical	24%	51%	10%	0%	0%
Black Office/Clerical	3%	11%	46%	4%	0%
White Craftworkers	25%	58%	5%	0%	0%
Black Craftworkers	4%	14%	31%	4%	1%
White Operatives	18%	47%	18%	0%	0%
Black Operatives	1%	5%	66%	7%	1%
White Laborers	26%	50%	23%	1%	0%
Black Laborers	2%	4%	83%	19%	4%
White Service Workers	23%	42%	25%	1%	0%
Black Service Workers	2%	4%	78%	26%	4%

* Co-worker racial composition excludes each person himself from his environment; i.e. is racial composition of others besides himself

** Refers to Non-Hispanic whites only

*** 0% refers to less than 0.5%

Table 3

Racial Segregation in Employment
within Occupational Level, within Sex

Occupational Level	Black and non-Hispanic White Men			Black and non-Hispanic White Women		
	Avg. % Black for non-Hispanic Whites	% Black	Segregation Index	Segregation Index	Avg. % Black for non-Hispanic Whites	% Black
Managers	2.3	2.6	12	25	4.4	5.9
Professionals	1.9	2.0	10	26	4.0	5.3
Technical Wkrs.	3.5	4.0	15	26	8.5	11.4
Sales Workers	3.6	4.4	20	25	5.1	6.8
Clerical Wkrs.	7.5	9.4	21	22	7.6	9.7
Craft Workers	5.7	6.7	16	26	8.6	11.6
Operatives	11.4	14.9	23	28	9.3	13.0
Laborers	13.6	21.9	38	52	9.1	18.8
Service Wkrs.	14.5	22.7	36	44	12.5	22.2
All Jobs	8.2	9.9	18	25	9.0	11.9

Table 4

Racial Segregation Across All Jobs for
Whites* and Blacks of Particular Occupations

	Segregation Indices		
	Whites* and blacks in same occupation	Whites* in this occupation from blacks in all occupations**	Blacks in this occupation from whites* in all occupations**
Managers	15	4	18
Professionals	14	6	16
Technical	20	10	15
Sales	21	13	18
Clerical	20	13	14
Craft	16	9	15
Operatives	23	21	15
Laborers	40	39	22
Service Workers	38	36	23

*Non-Hispanic Whites only

**Adjusted index (see text)

Table 5

Racial Distribution and Segregation
by Type of Industry, by Sex

Industry	Total, Both Sexes		MEN			WOMEN		
	Avg. % Black for Whites	Segregation Index	Distribution of Male Employment	Avg. % Black for Whites	Segregation Index	Distribution of Female Employment	Avg. % Black for Whites	Segregation Index
Extractive & Construction	7.4%	20	4.1%	7.5%	21	0.8%	5.3%	13
Non-durable Manufacturing	9.4	20	16.3	8.9	19	16.2	9.7	28
Durable Manufacturing	8.7	14	38.8	8.5	15	16.8	8.9	18
Transportation/ Communication	9.7	21	11.0	8.4	18	6.0	12.7	31
Wholesale Trade	6.7	18	4.5	6.7	20	2.4	6.0	19
Retail Trade	7.4	19	8.8	7.7	17	19.0	6.9	22
Finance, Ins., Real Estate	9.2	13	4.2	6.5	14	10.5	10.8	16
Services	8.7	27	12.5	7.9	27	28.2	9.0	29
All Industries	8.7	19	100%	8.2	18	100%	9.0	25

Table 6

Segregation Indices for Blacks vs. non-Hispanic Whites for Occupations by Industry

Industry	Occupational Categories									
	All Occupations	Managers	Profes-sionals	Technical Workers	Sales Workers	Clerical Workers	Craft Workers	Operatives	Laborers	Service Workers
Extrative & Construction	20	11	13	17	17	13	16	30	40	37
Non-durable Manufacturing	20	12	07	16	14	12	21	26	47	41
Durable Manufacturing	14	04	00	10	17	07	13	19	35	35
Transportation/ Communication	21	06	08	15	12	27	13	25	32	48
Wholesale Trade	18	14	15	10	13	09	40	36	40	50
Retail Trade	19	17	31	40	17	19	30	30	32	28
Finance/Insurance/ Real Estate	13	09	06	15	43	17	09	23	35	39
Services	27	24	24	22	58	17	12	32	50	37
All Industries	19	15	14	20	21	20	16	23	40	38
Within-industry Segregation*	18	12	12	17	19	16	16	23	39	35

*Weighted average for 8 industries. Weighted by total number of workers in that occuption by industry.

Table 7

Correlations among Percent Black in Each Occupational Category across Places of Work*

Percent Black among.. (correlation coeff.)	Managers	Profes-sionals	Technical Workers	Sales Workers	Clerical Workers	Craft Workers	Operatives	Laborers	Service Workers
All Occupations	.54	.46	.45	.52	.49	.62	.72	.71	.56
All Other Occupations	.50	.44	.41	.38	.39	.52	.58	.60	.46
Managers	1.00	.54	.42	.51	.48	.28	.32	.29	.25
Professionals		1.00	.46	.60	.46	.19	.25	.21	.23
Technical Workers			1.00	.22	.39	.25	.26	.27	.29
Sales Workers				1.00	.51	.22	.19	.22	.23
Clerical Workers					1.00	.26	.28	.27	.35
Craft Workers						1.00	.49	.45	.30
Operatives							1.00	.62	.46
Laborers								1.00	.49
Service Workers									1.00

*For places of work with at least one person in each occupation of the pair. The minimum N is about 1500 establishments (sales workers x technical workers).

Table 8

Occupation-specific Employment Segregation for Establishments
Grouped by Racial Composition of Workers in Remaining Occupational Categories
(results for selected categories)

Percent Black in Remaining Categories	Managers	Profes-sionals	Technical Workers	Sales Workers	Clerical Workers	Craft Workers	Operatives	Laborers	Service Workers
0.1 - 2.9% black	5	5	8	5	11	10	10	13	15
5.0 - 9.9% black	6	4	12	6	11	8	8	20	27
20.0 -29.9% black	6	5	13	16	16	10	8	19	23
40.0 -49.99% black	9	5	10	37	9	18	35	16	31
60 -69.9% black	30	43	56	42	43	29	23	33	19

Table 9

Regression Analyses of Percent Black Among Workers in Same Occupation Category

Dependent Variables: Percent Black Among...	Statistically significant partial associations [beta]					R^2	N
	Percent Black at establishment, all other occupations	Total number employees	Number employees, this occupation	Proportion of total employees in this occupation	[Usefulness**0.5] Industry[a]		
Managers/Officials	+.43*	--	--	--	.16*	.21	3675
Professionals	+.26*	--	--	+.16*#	.09	.09	1736
Technical Workers	+.37*	--	--	--#	.16*	.18	1510
Sales Workers	+.34*	--	--	+.14*	.11*	.16	2076
Clerical Workers	+.31*	--	+.13*	+.15*	.08*	.14	3231
Craft Workers	+.52*	-.06	--	--	.11*	.28	2243
Operatives	+.58*	--	--	--	.08*	.35	2253
Laborers	+.60*	--	--	--	.15*	.37	1655
Service Workers	+.42*	--	--	-.10*#	.17*	.22	1898

*Statistically significant at $p < .01$

#A separate regression including squared terms explained a statistically significant increment in R^2, with the beta coefficients in the expected direction (see text).

[a]Measure of association shown for industry is the square root of the increment in R^2 due to adding the seven industry dummy variables. This statistic is comparable in magnitude (for similar degrees of association) to the beta coefficient shown for single-variable predictors.